

What is claimed is:

1. A method for upgrading software in a first bridge operating in a first state in a network containing a plurality of bridges, the first bridge and one or more of
5 the second bridges forming part of a VLAN, the method comprising:
 - a) sending notification to one or more second bridges that the first bridge is scheduled for upgrading thereby disturbing the first state of operation;
 - b) suspending VLAN registration information in the one or more second
bridges while upgrading the first bridge;
 - 10 c) restoring the first state of the first bridge; and
 - d) sending notification to the one or more second bridges of the network that the upgrading of the first bridge has been completed.
2. The method of claim 1 wherein the step of sending notification further
15 comprises the first bridge sending a GVRP message.
3. The method of claim 2 wherein the GVRP message uses a customizable attribute event under IEEE802.1D-1998.
- 20 4. The method of claim 1 wherein once the notification has been sent to one or more second bridges in the network, said one or more second bridges do not expect additional messages from the first bridge subsequent to notification.
- 25 5. The method of claim 1 where the step of suspending VLAN registration information comprises suspending the expiration of "Leave All" timers during the upgrading at the first bridge.
6. The method of claim 1 where the step of suspending VLAN registration
30 information comprises suspending a predetermined period of time for removing VLAN registration membership until after the first bridge is upgraded.

7. The method of claim 1 wherein the step of restoring the first state of the first bridge further comprises synchronizing GVRP protocol to a VLAN registration table preserved in the first bridge during the upgrade.
- 5 8. The method of claim 7 wherein if a port of the first bridge is dynamically configured for a certain VLAN and is registered as a member of that VLAN, the synchronizing results in a corresponding Registrar state machine assuming an In (IN) state.
- 10 9. The method of claim 7 wherein if a port of the first bridge is dynamically configured for a certain VLAN and is not registered as a member of that VLAN, synchronizing results in a corresponding Registrar state machine assuming an Empty (MT) state.
- 15 10. The method of claim 7 wherein for a certain port and VLAN, the corresponding Applicant state machine assumes a Very Anxious Active Member state (VA), if at least one Registrar state machine for this VLAN associated to another active port of the same node is in an IN state.
- 20 11. The method of claim 7 wherein for a certain port and VLAN, the corresponding Applicant state machine assumes a Very Anxious Observer state (VO), if no Registrar state machine for this VLAN associated to another active port of the same node is in an IN state.
- 25 12. The method of claim 1 wherein the step of sending notification to one or more second bridges that the upgrading of the first bridge has been completed comprises sending a normal GVRP message to one or more frozen ports of said one or more second bridges.
- 30 13. The method of claim 12 wherein the GVRP message uses a customizable attribute event under IEEE802.1D-1998.

14. A computer readable medium containing a program which, when executed, performs an operation of upgrading software in a first bridge operating in a first state in a network containing a plurality of bridges, the first bridge and one or more second bridges forming part of a VLAN, the operation
- 5 executing the steps of:
- a) sending notification to one or more second bridges that the first bridge is scheduled for upgrading thereby disturbing the first state of operation;
 - b) suspending VLAN registration information in the one or more second bridges while upgrading the first bridge;
 - 10 c) restoring a state of the first bridge prior to it being updated; and
 - d) sending notification to the one or more second bridges of the network that the upgrading of the first bridge has been completed.
15. The computer readable medium of claim 14 wherein the step of sending
- 15 notification further comprises the first bridge sending a GVRP message.
16. The computer readable medium of claim 15 wherein the GVRP message uses a customizable attribute event under IEEE802.1D-1998.
- 20 17. The computer readable medium of claim 14 wherein once the notification has been sent to one or more second bridges in the network, said one or more second bridges do not expect additional messages from the first bridge subsequent to notification.
- 25 18. The computer readable medium of claim 14 wherein the step of suspending VLAN registration information comprises suspending the expiration of "Leave All" timers during the upgrading of the first bridge.
19. The computer readable medium of claim 14 wherein the step of
- 30 suspending VLAN registration information comprises suspending a predetermined period of time for removing VLAN registration membership until after the first bridge is upgraded.

20. The computer readable medium of claim 14 wherein the step of restoring the first state of the first bridge further comprises synchronizing GVRP protocol to a VLAN registration table preserved in the first bridge during the upgrade.
- 5 21. The computer readable medium of claim 20 wherein if a port of the first bridge is dynamically configured for a certain VLAN and is registered as a member of that VLAN, the synchronizing results in a corresponding Registrar state machine assuming an In (IN) state.
- 10 22. The computer readable medium of claim 20 wherein if a port of first bridge is dynamically configured for a certain VLAN and is not registered as a member of that VLAN, synchronizing results in a corresponding Registrar state machine assuming an Empty (MT) state.
- 15 23. The computer readable medium of claim 20 wherein for a certain port and VLAN, the corresponding Applicant state machine assumes a Very Anxious Active Member state, if at least one Registrar state machine for this VLAN associated to another active port of the same node is in an IN state.
- 20 24. The computer readable medium of claim 20 for a certain port and VLAN, the corresponding Applicant state machine assumes a Very Anxious Observer (VO) state, if no Registrar state machine for this VLAN associated to another active port of the same node is in an IN state.
- 25 25. The computer readable medium of claim 14 wherein the step of sending notification to one or more second bridges that the upgrading of the first bridge has been completed comprises sending a normal GVRP message to one or more frozen ports of said one or more second bridges.
- 30 26. The computer readable medium of claim 25 wherein the GVRP message uses a customizable attribute event under IEEE802.1D-1998.
27. A network bridge apparatus comprising:
a forwarding plane adapted to store VLAN membership information; and

a control plane adapted for issuing and executing instructions that control upgrading of software of said network bridge apparatus according to said VLAN membership information including :

- 5 a) sending notification to one or more second bridges that the first bridge is scheduled for upgrading;
- b) suspending VLAN registration information in the one or more second bridges while upgrading the first bridge;
- c) restoring a state of the first bridge prior to it being updated; and
- 10 d) sending notification to the one or more second bridges of the network that the upgrading of the first bridge has been completed.

28. The apparatus of claim 23 further comprising the step of restoring a state of the first bridge further comprises synchronizing GVRP protocol to a current VLAN membership tables.